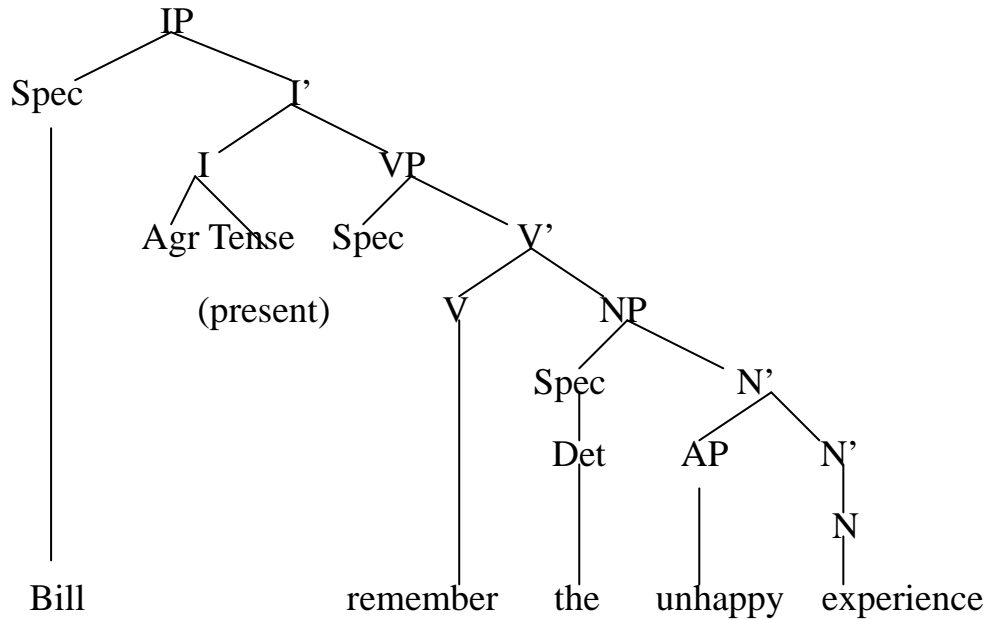# X-bar Theory
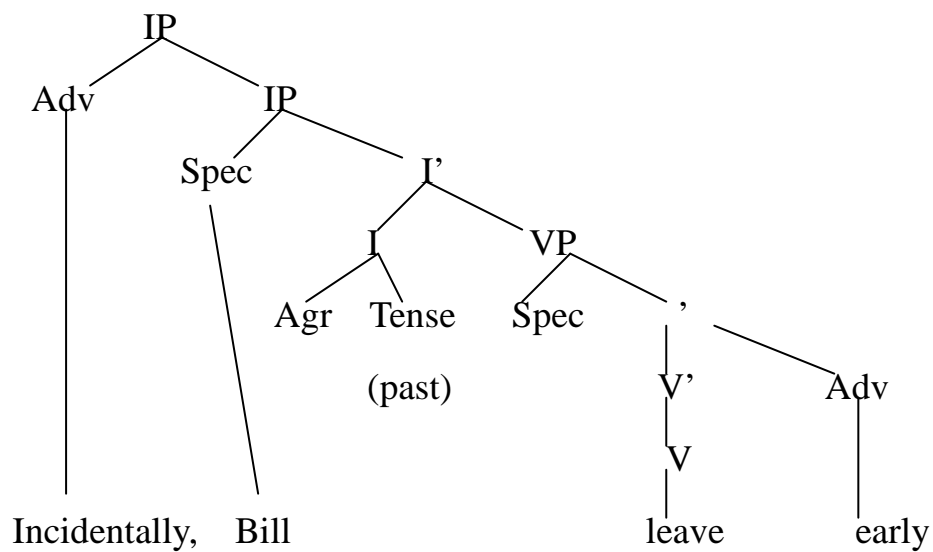
Exercise 1: Assign an X-bar structure to the sentences in (1-5):
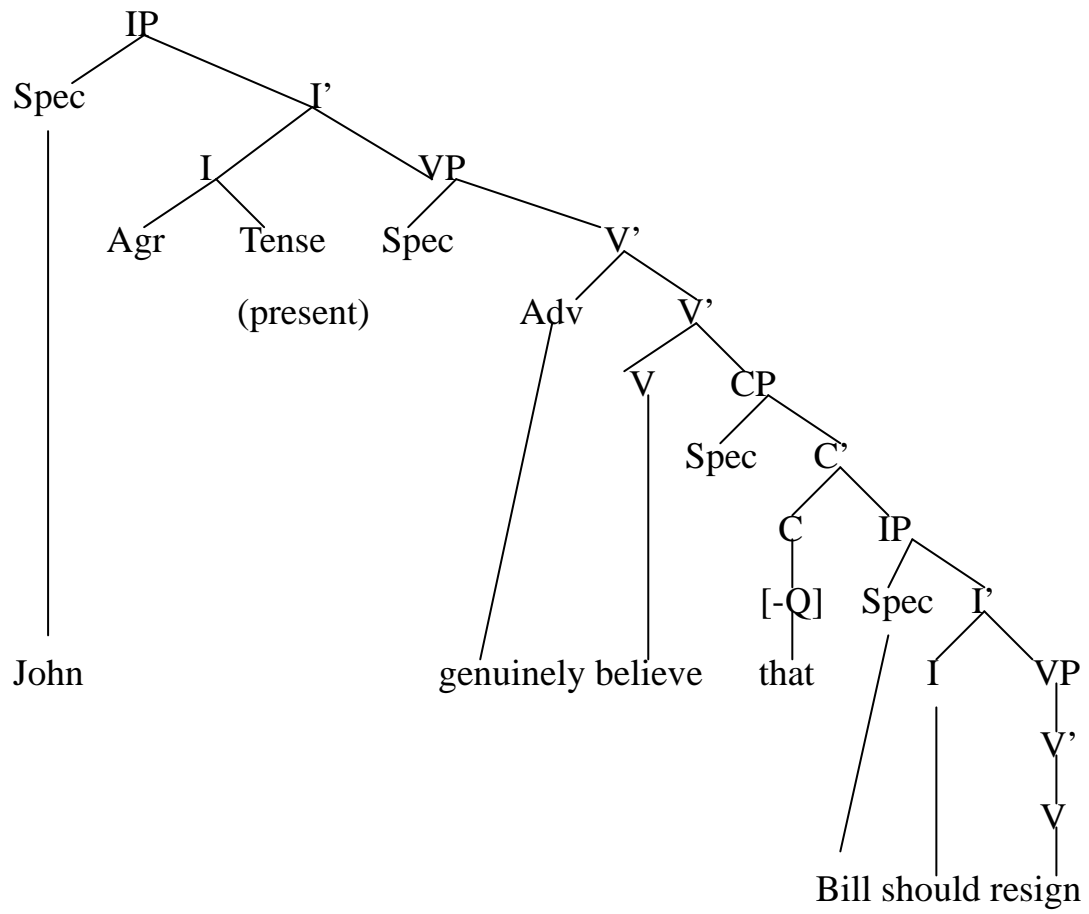
1. Bill remembers the unhappy experience.

IP
Spec — I'
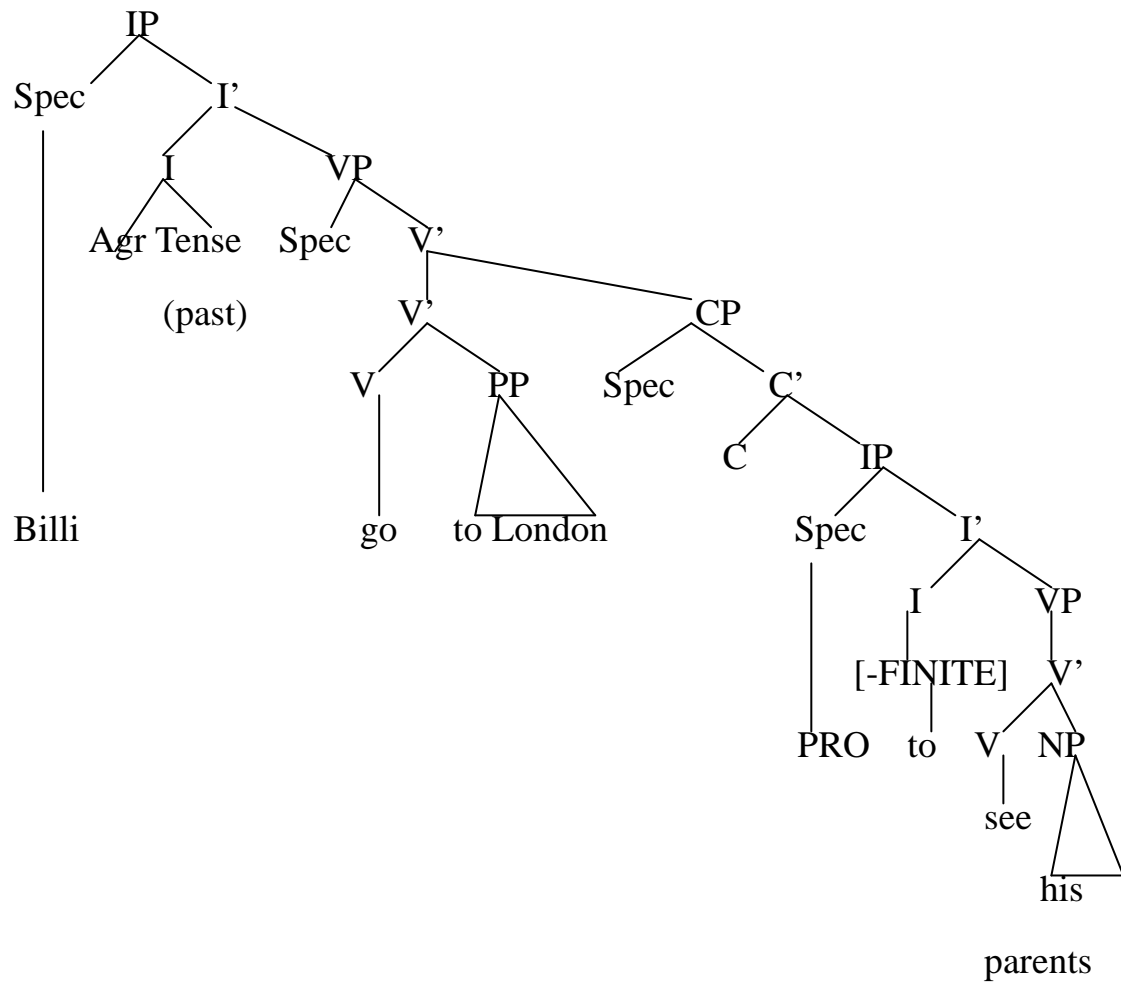I (Agr Tense) VP
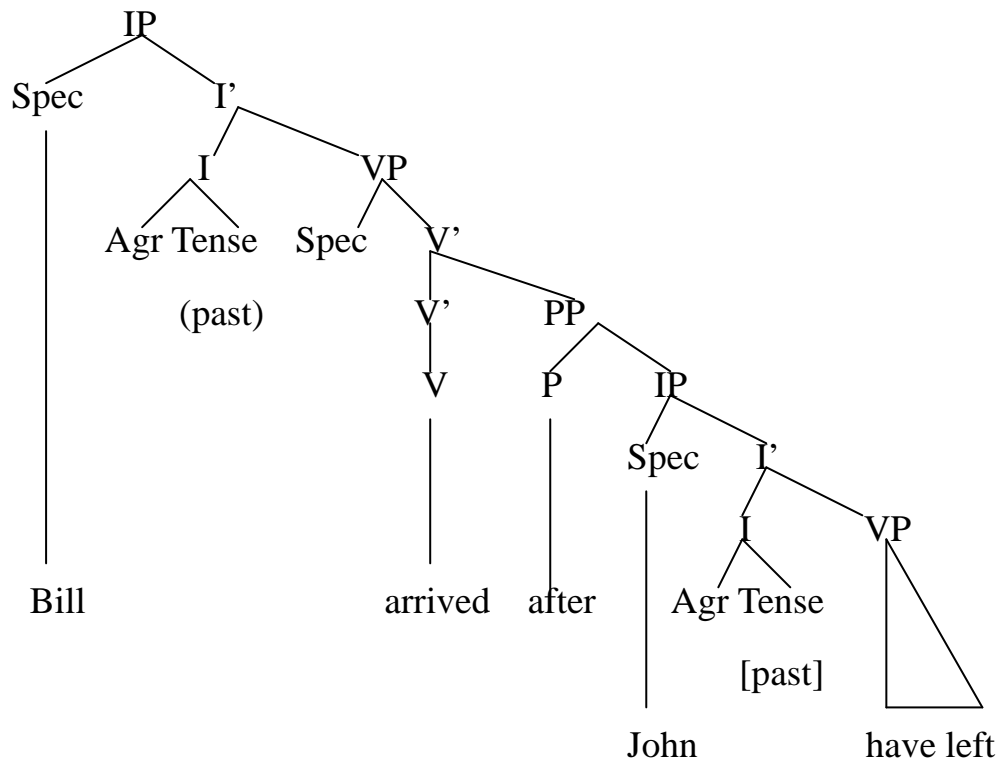(present)
Spec — V'
V — NP
Spec (Det) — N'
AP — N'
N
Bill — remember — the — unhappy — experience

2. Incidentally, Bill left early.

IP
Adv — IP
Spec — I'
I (Agr Tense) VP
(past)
Spec — V' — Adv
V
Incidentally, — Bill — leave — early

3. John genuinely believes that Bill should resign.

IP
- Spec
  - John
- I'
  - I
    - Agr
    - Tense
      - (present)
  - VP
    - Spec
    - V'
      - Adv
        - genuinely
      - V'
        - V
          - believe
        - CP
          - Spec
          - C'
            - C
              - [-Q]
              - that
            - IP
              - Spec
                - Bill
              - I'
                - I
                  - should
                - VP
                  - V'
                    - V
                      - resign

4. Bill went to London to see his parents.

```
                        IP
               /         \
            Spec          I'
             |          /    \
             |         I      VP
             |       /  \    /   \
             |    Agr  Tense Spec  V'
             |        (past)      /   \
             |                   V'     CP
             |                  /  \   /   \
             |                 V   PP Spec  C'
             |                 |   /\      /   \
             |                 |  /  \    C     IP
             |                 | /    \        /   \
           Billi              go  to London  Spec   I'
                                              |    /   \
                                              |   I      VP
                                              | [-FINITE] V'
                                             PRO  to    /  \
                                                       V    NP
                                                       |    /\
                                                      see  /  \
                                                          his
                                                        parents
```

5. Bill arrived after John had left.

IP
Spec — I'
Bill

I — VP
Agr Tense
(past)

Spec — V'
V' — PP
V
arrived

P — IP
after

Spec — I'
John

I — VP
Agr Tense
[past]
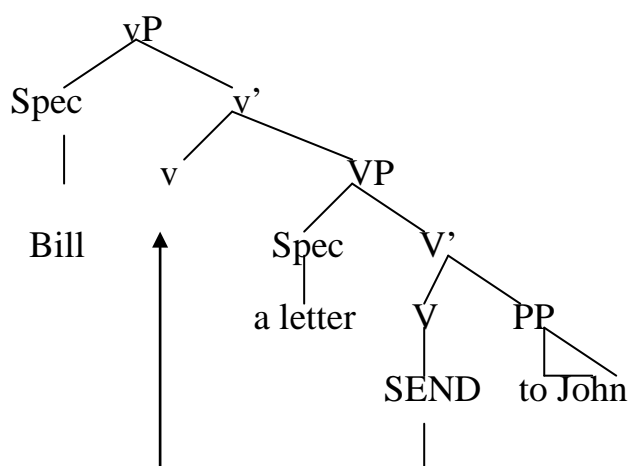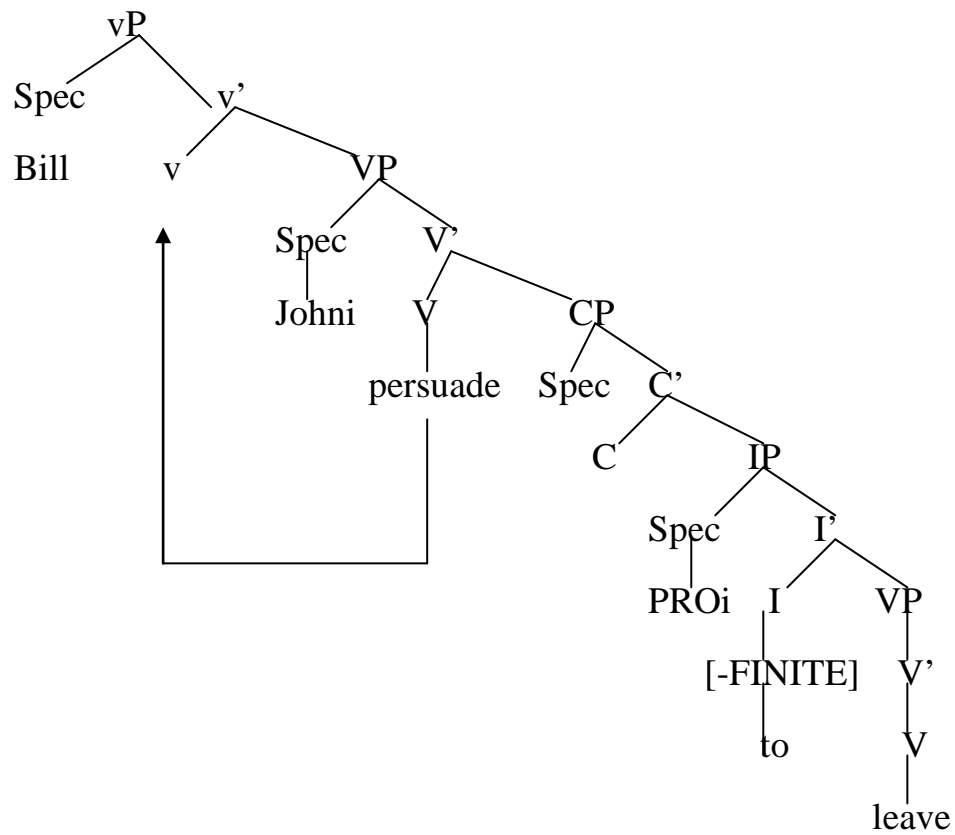have left

Exercise 2: Assign an X-bar structure to sentences in (1-4) and explain how the order inside VP is derived.

1. Bill sent a letter to John.
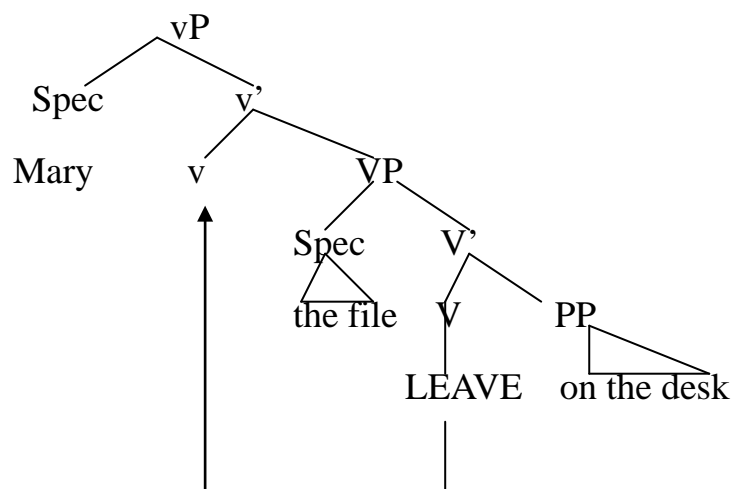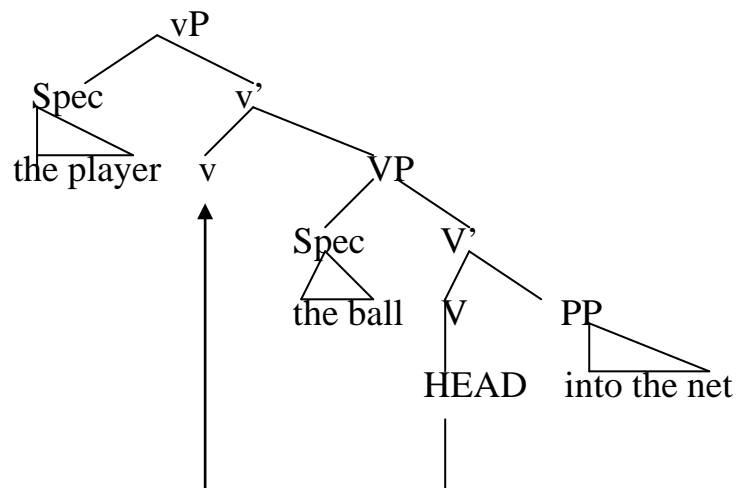
vP
Spec — v'
Bill

v — VP
Spec — V'
a letter

V — PP
SEND   to John

2. Bill persuaded John to leave.

3. Mary left the file on the desk.

4. The player headed the ball into the net.

Exercise 3: Explain how the sentences in (1-5) are excluded. Identify the principle violated and explain how it is violated:

1. **The player headed.*

   This sentence violates the Projection Principle because the verb '*head*' [V; __NP] subscribes for an NP, but there is no NP at its object position.
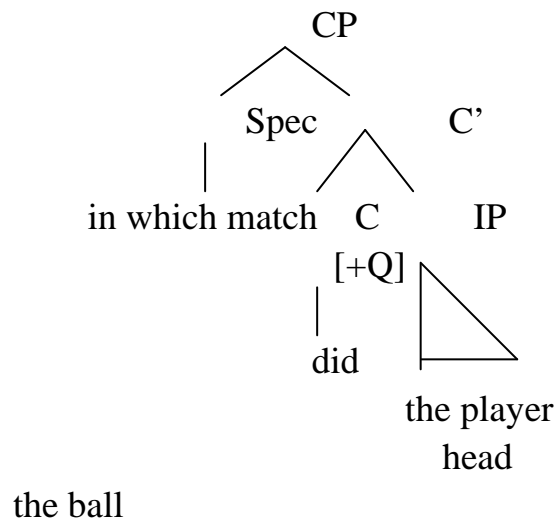
2. **Headed the ball.*

   This sentence lacks a subject and thus, violates the Extended Projection Principle.
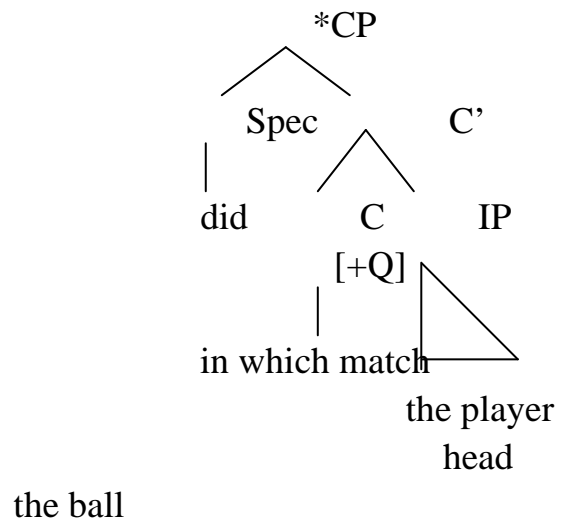
3. **Did in which match the player head the ball?*

   This sentence violates the X-bar theory. According to X-Bar Theory, the Aux '*did*' is located in the Comp position by Aux-raising and

wh-phrase *'in which match'* is moved to the Spec,CP by wh-movement. However, sentence (3) shows that *did* is in the Spec,CP and wh-phrase is in the Comp position. See the illustrations below:

Correct structure:

```
                    CP
            ┌───────┴────────┐
          Spec              C'
           │          ┌──────┴──────┐
    in which match    C            IP
                     [+Q]       ┌───┘
                      │         │
                     did      the player
                              head
the ball                       the ball
```

Incorrect structure:

```
                    *CP
            ┌───────┴────────┐
          Spec              C'
           │          ┌──────┴──────┐
          did         C            IP
                     [+Q]       ┌───┘
                      │         │
              in which match   the player
                              head
                               the ball
```

4. *I *wonder the player headed the ball in which match.*

Since the verb '*wonder*' subcatogorizes for an interrogative clause, and the Comp is marked with the feature [+Q]. According to the [+Q]-CP Principle, a [+Q]-CP must have a specifier. However, the Spec,CP position in the sentence is empty. Please refer to the illustration below:

```
                  CP
          ┌────────┴────────┐
        Spec               C'
         │           ┌──────┴──────┐
        [+Q]         C            IP
         │                    ┌────┘
I wonder  e          the player headed the ball [in which match]
```
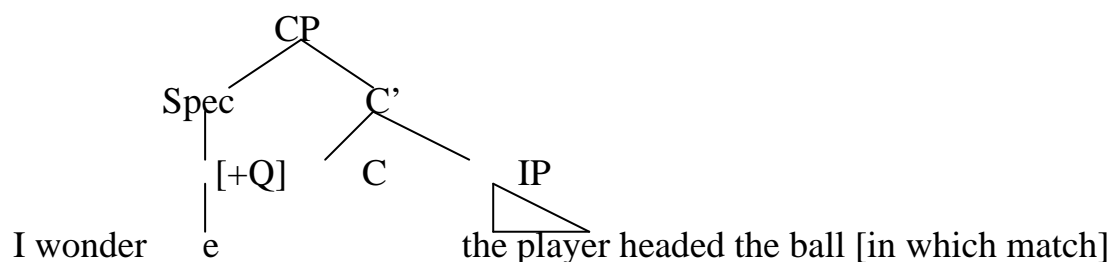
5. *Which way I wonder if the player headed the ball?

This sentence violates the wh-island condition in that it moves the wh-phrase 'which way' out from an embedded wh-clause even though the wh-phrase is invisible. Please see the following illustration:

[Which way]i I wonder [CP wh-O [C' if the player headed the ball ti]]

wh-island
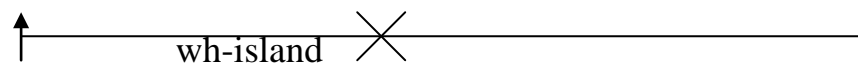
Exercise 4: Evaluate the following sentences and explain why such sentences are said to constitute empirical evidence in favor of the structure of the X-bar theory and against that of the relevant PS rule:

1. That John should leave suddenly is puzzling.

2. To start with the simple exercises seems reasonable.

3. Blaming others is not the solution.

4. Bill believes that watching football is boring.

5. Now is the time to do it.

According to PS rules, S(entence) can be analyzed as S→NP Aux VP, VP → V (NP) (PP), NP → Det N, and so on. However, the five sentences above seem unable to be decomposed into S → NP Aux VP. For example, sentence (1) starts with a clause, sentence (2) with a non-finite clause, sentence (3) with a gerundive phrase, and sentence (5) with an adverb in the subject position. Even if we create other PS rules to include the above elements into the category of NP subject, we still have problem dividing a non-finite clause or a gerundive phrase into NP→ (Det) N. Such complicate grammar is an undesirable consequence since it violates the

spirit of simplicity in UG.

Unlike PS rules, which 'decodes' sentences from a Top-down point of view, X-Bar Theory 'encodes' sentences from a Bottom-up perspective (X→X'→X"). PS rules proliferate sets of rules to 'describe' structural representations of phrasal categories and to perform operations between them, but X-bar theory 'determines' the structural representations with general principles, such as Projection Principle and EPP, and simplifies grammar to the structural relation between Head and its Maximal Projection, namely: XP→Spec X'; X'→ X ZP. In X-bar schema, the subject position, or the Spec,XP is left undetermined. In other words, unlike PS rules, X-bar theory allows freedom in this very position to be filled or specified with flexible categories. Therefore, in conclusion, the above five sentences, having non-NP occupy the subject position, though cannot be solved by PS rules, can be clarified by X-bar theory.


Exercise 5: Explain whether the following sentences are consistent with the analysis of small clauses in this chapter. Note that in sentences (2) and (3), *very* **and** *rather* **are said to occupy the Spec position of the AP. Explain your opinion:**

1. Bill considers John a genius.

2. John considers Bill very intelligent.

3. Bill finds John rather suspicious.

According to the analysis in this chapter, small clause lacks an I-element and its X-bar projection. The example given is '*John considers [Bill incompetent]*'. The categories in the small clause are the NP subject
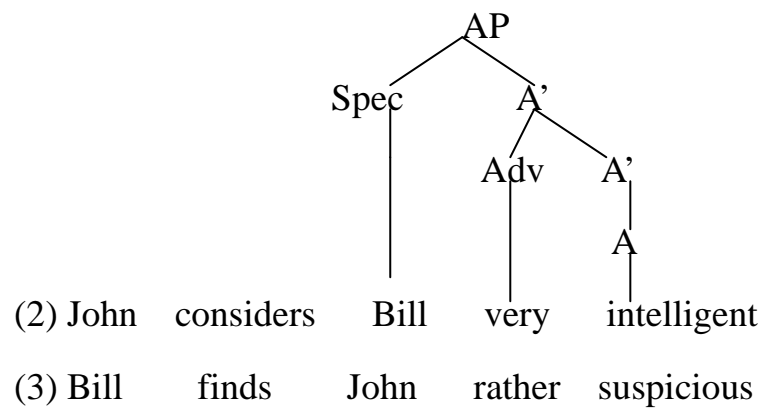
9

Bill and the predicative AP *incompetent*. '*Bill*' must occupy the subject position, namely, the Spec position in X-bar structure. The status of the small clause as an AP is determined by the categorical property of the predicate, which is an adjective.

Here in example (1), the predicate of the small clause '*a genius*' is an NP. In the previous X-bar analysis of NP, the determiner '*a*' is located at the Spec,NP position. That being the case, the Spec position of this NP small clause is occupied by two elements, namely, subject '*John*' and Det '*a*'. This situation would be inconsistent with the analysis of small clauses in this chapter. But if we re-examine the status of Det in NP structure, we will find that not all nouns require a determiner. Some Head N (e.g. *book, car*) require a determiner while others (e.g. *Bill, Japan*) do not. From this view, determiners seem to be optional and can be treated as an adjunct in an NP structure. In this way, treating the small clause in example (1) as NP would become consistent with the analysis of this chapter. See the following illustration:
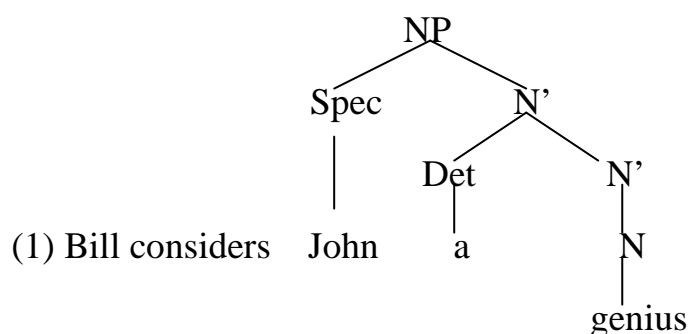
Similarly, if we claim that the modifier *very* and *rather* in example (2) and (3) are located in Spec,AP position, the Spec of the small clause would be occupied with two elements: the subject NP and the modifier,

which would violates the analysis of small clause in this chapter. The solution, again, would be treating the modifier as an optional adjunction. The structure would thus be as follows:

```
                          AP
                    Spec       A'
                            Adv     A'
                                     A
        (2) John  considers  Bill   very   intelligent
        (3) Bill    finds    John   rather  suspicious
```

Exercise 6: Suggest a way of dealing with the sentences in (1a,b) and (2a,b) using the VP-shell structure discussed in this chapter. Explain whether both types of sentences can be derived from the same DS.
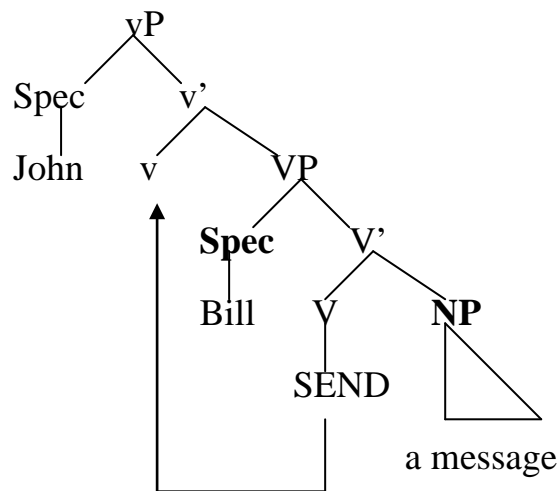
(1a) John sent Bill a message.
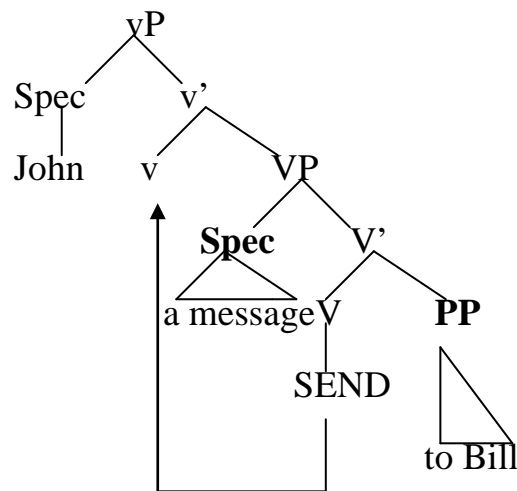*(1b) John sent a message to Bill.*

(2a) Mary gave John a book.
(2b) Mary gave a book to John.

First of all, let's draw tree diagrams of VP-shell to illustrate sentences (1a) and (1b). Note that v refers to light verb while V is the impoverished version of the verb itself.

(1a)

(1b)

In sentence (1a), NP complement '*a message*' is located under lower VP (headed by SEND), but in (1b), it is located at the Spec position of lower VP. Moreover, the Spec,NP '*Bill*' in (1a) becomes the PP complement '*to Bill*' located under lower VP in (1b). Sentences (2a) and (2b) bear the same situation. In other words, the two types of sentences are derived from different DS in terms of the VP-shell structure.

Exercise 7 : Determine the structural status of the PP constituents *of Physics* and *with long hair* in the noun phrases (1-5). Explain why (2) and (5) are excluded. You may want to consult the section on co-ordination in Chapter 2.
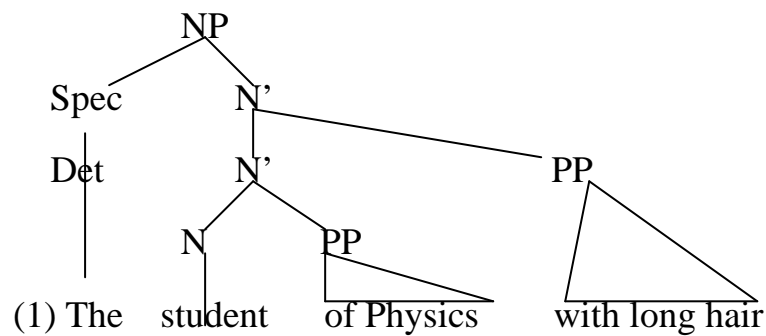
1. *The student of Physics with long hair*

2. **The students with long hair of Physics*

3. *The student of Physics and Chemistry*

4. *The student with long hair and (with) a big moustache*

5. *The student of Physics and with long hair*

According to the notion of co-ordination, the grammaticality of sentences (3) and (4) as well as the ungrammaticality of sentence (5) indicate that the two preposition phrases *'of physics'* and *'with long hair'* seem to have different syntactic behavior. To clarify their syntactic relationship with NP *'the student'*, please refer to the following X-bar tree structure of sentences (4), (5), (1), and (2).
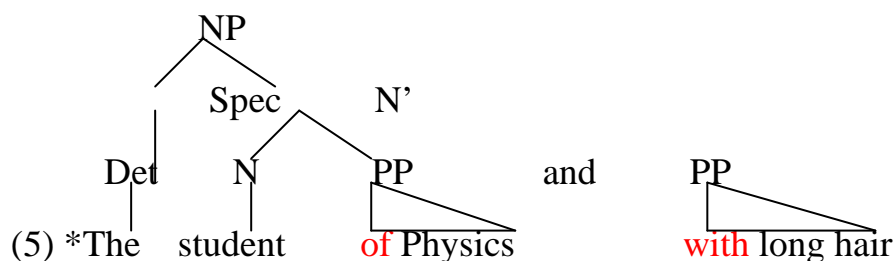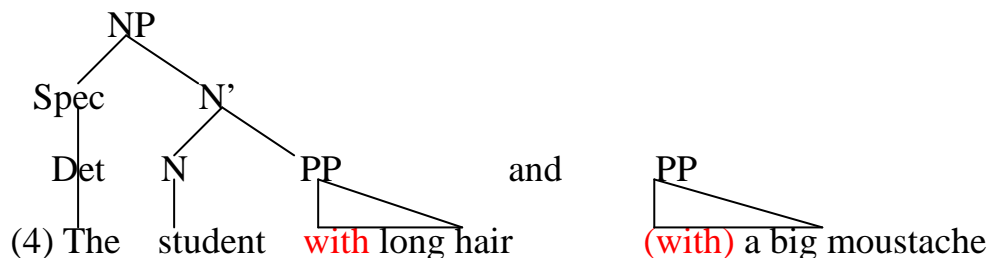
The above two diagrams illustrate that the two PPs *'of Physics'* and *'with long hair'* cannot be consider syntactically parallel in X-bar structure. Therefore, we may consider that one of them is an adjunct while the other is the compliment of Head N. This is exactly the structure reflected in sentence (1).

NP

Spec   N'

Det   N'   PP

N   PP

(1) The   student   of Physics   with long hair

As shown above, the PP '*of Physics*' has a closer relationship with Head noun '*student*'— they are sisters under N'. But the PP '*with long hair*' has an ambiguous relation with Head noun since it is both the daughter and the sister of N'. With this in mind, the ungrammaticality of sentence (2) can be explained since the positions of compliment PP and adjunction PP are wrongly exchanged. See the structure below:

NP

Spec   N'

Det   N'   PP

N   PP

(2) *The   student   with long hair   of physic